

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

**MARK SCHEME for the May/June 2012 question paper
for the guidance of teachers**

0581 MATHEMATICS

0581/33

Paper 3 (Core), maximum raw mark 104

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

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Abbreviations

| | |
|-----|----------------------------|
| cao | correct answer only |
| cso | correct solution only |
| dep | dependent |
| ft | follow through after error |
| isw | ignore subsequent working |
| oe | or equivalent |
| SC | Special Case |
| www | without wrong working |
| soi | seen or implied |

| Qu. | Answers | Mark | Part Mark |
|----------|---------------------------------------|----------------------|---|
| 1 | (a) (i) -4 | 1 | allow -8 |
| | (ii) -4 -3 -1 2 5 | 1 | |
| | (iii) 8 | 1 | |
| | (b) (i) 1305 | 1 | |
| | (ii) 3 (h) 35 (m) cao | 1 | |
| | (c) 488 km/h | 1 1 | |
| 2 | (a) 1, 2, 4, 7, 14, 28 | 2 | 1 for four or five correct or 1×28 and 2×14 and 4×7 M1 for a method to achieve this such as prime factors, $8 = 2^3$ and $14 = 2 \times 7$ or another multiple of 56, or two trials accept 8 56 (am) B1 for either $84a$ or $36c$ |
| | (b) 24 | 1 | |
| | (c) 5832 | 1 | |
| | (d) ($p =$) 2 ($q =$) 5 | 1 1 | |
| | (e) (i) 56 | 2 | |
| | (ii) 08 56 | 1ft | |
| | (iii) $84a + 36c$ final answer | 2 | |

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| | | | | | |
|------|---------------------------------------|--|---|--|--|
| 3 | (a) | quadrilateral | 1 | | |
| | (b) | obtuse | 1 | | |
| | (c) | 23.6–24.4 | 2 | M1 for 11.8 – 12.2 | |
| | (d) | 31–35 | 1 | | |
| | (e) | construction of perpendicular bisector of EH part circle centre H radius 7 cm indication of region | 5 | B1 for two pairs of arcs, same radius, centres E and H B1 for bisector within 2mm of correct one, $\pm 2^\circ$ of correct angle B1 for part circle centre H B1 for radius 7 cm B1ft for an indication of the region, ft dependent on at least B2 from above | |
| | (f) | 6135.36 or 6135.4 or 6135 or 6140 | 2 | M1 for $33.2 \times 16.8 \times 11$ | |
| 4 | (a) | 107.52 | 3 | M1 $2 \times 24 + 3 \times 16$ or 96 M1 for their 96×1.12 oe | |
| | (b) | 28.8(0) | 2 | M1 for $24 \times 1.2(0)$ oe | |
| | (c) | 14 | 3 | B1 for 42(c) or (\$ 0).42 M1 for their $\frac{42}{300}$ oe ($\times 100$) or $\frac{0.42}{3}$ ($\times 100$) alt. method : M1 $\frac{3.42}{3}$ ($\times 100$) or $\frac{342}{300}$ ($\times 100$) M1 their 114 – 100 | |
| 5 | (a) | two correct ruled lines | 1,1 | SC1 correct but freehand or fully correct with one extra line | |
| | (b) | correct square shaded | 1 | | |
| | (c) | correct enlargement | 2 | 1 for a correct side | |
| | (d) | (i) | 1, –5 | 1 | |
| | | (ii) | correct reflection | 1 | |
| | (iii) | correct translation | 2 | B1 for either direction e.g. 1 to the right or 3 down SC1 for complete correct 3 left and 1 up triangle | |
| (iv) | rotation, (centre) (0,0) angle 180 | 3 | 1 for rotation, 1 for (centre) (0,0), 1 for angle 180 | | |

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| | | | | |
|-----|--------------------------|--|---|---|
| 6 | (a) | 3 : 4 cao | 1 | |
| | (b) | 168 | 2 | M1 $420 \div (2 + 3)$ or 84 seen |
| | (c) | $300 \div 20 = 15$ | 2 | if 0 scored SC1 for $\frac{250/260/270/300}{20/23/25}$ or 15 ww |
| | (d) | 68.5(2) | 2 | M1 for 46.3×1.48 , 68.53 or 68.524 |
| | (e) (i) | 64.5 | 1 | |
| | (ii) | 1805 | 1 | |
| 7 | (a) | four points correctly plotted | 2 | M1 for three points correctly plotted |
| | (b) | positive | 1 | ignore extras like 'strong' |
| | (c) (i) | 54.8 | 2 | M1 for their sum $(548) \div 10$ |
| | (ii) | 46 | 1 | |
| | (iii) | A and it has a lower mean | 1ft | allow any correct reason using appropriate information from the table and ft their mean |
| | (d) (i) | correct ruled line | 1 | at A = 40 allow 44–48 at A = 70 allow 70–78 |
| | (ii) | correct reading from their line | 1ft | read from their ruled line |
| (e) | 3 | 1ft | | |
| 8 | (a) | (20) 13 (8) 5 4 5 (8) 13 (20) | 3 | B2 for 4 correct B1 for 2 or 3 correct or a correct substitution seen |
| | (b) | correctly plotting 9 points and connecting with a smooth curved line | 4 | P3 for correctly plotting 9 points, P2 for correctly plotting 7 or 8 points and P1 for 5 or 6 points C1 for a smooth curve |
| | (c) (i) | correct line of symmetry cao | 1 | |
| | (ii) | $x = 1$ | 1ft | ft their line |
| | (d) (i) | correct line | 1 | |
| | (ii) | -1.9 to -1.7 and 3.7 to 3.9 | 1ft,1ft | SC1 for correct co-ordinates |
| | (e) (i) | -3 cao | 1 | |
| | (ii) | (0,6) cao | 1 | |
| | (iii) | $y = c - 3x$ | 1 | c can be any number except 6 |
| (f) | $12x - 9$ or $3(4x - 3)$ | 2 | B1 for $6x + 3$, $-12 + 6x$, $12x$ or -9 | |

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| | | | | |
|-----------|----------------|--|-----------------------|--|
| 9 | (a) (i) | 60 | 1 | |
| | (ii) | 30 | 1ft | ft their (i) ÷ 2 |
| | (b) | 8 (cm) | 1 | |
| | (c) | $\cos 30 = \frac{x}{8}$ or $8^2 = x^2 + 4^2$ 6.928..... | M1ft | ft their angle <i>AOM</i> or <i>AB</i> |
| | (d) | 27.7(2) cao | A1 2 | M1 $\frac{1}{2} \times$ their (b) \times 6.93 soi |
| | (e) | 34.7–34.9 | 4 | M1 (circle) = $\pi \times 8^2$ soi M1 (hexagon) = $6 \times$ their (d) soi M1dep their circle – their hexagon |
| 10 | (a) | correct pattern | 1 | |
| | (b) (i) | 22 | 1 | |
| | (ii) | add 4 | 1 | must have 4 with a direction, accept plus 4 |
| | (c) | $4n + 2$ or $4(n - 1) + 6$ oe | 2 | B1 for $4n + j$ or $kn + 2$ ($k \neq 0$) seen |
| | (d) | 15 cao | 2 | M1 their (c) = 62 or multiple additions or subtractions |